

## PATENT ABSTRACTS OF JAPAN

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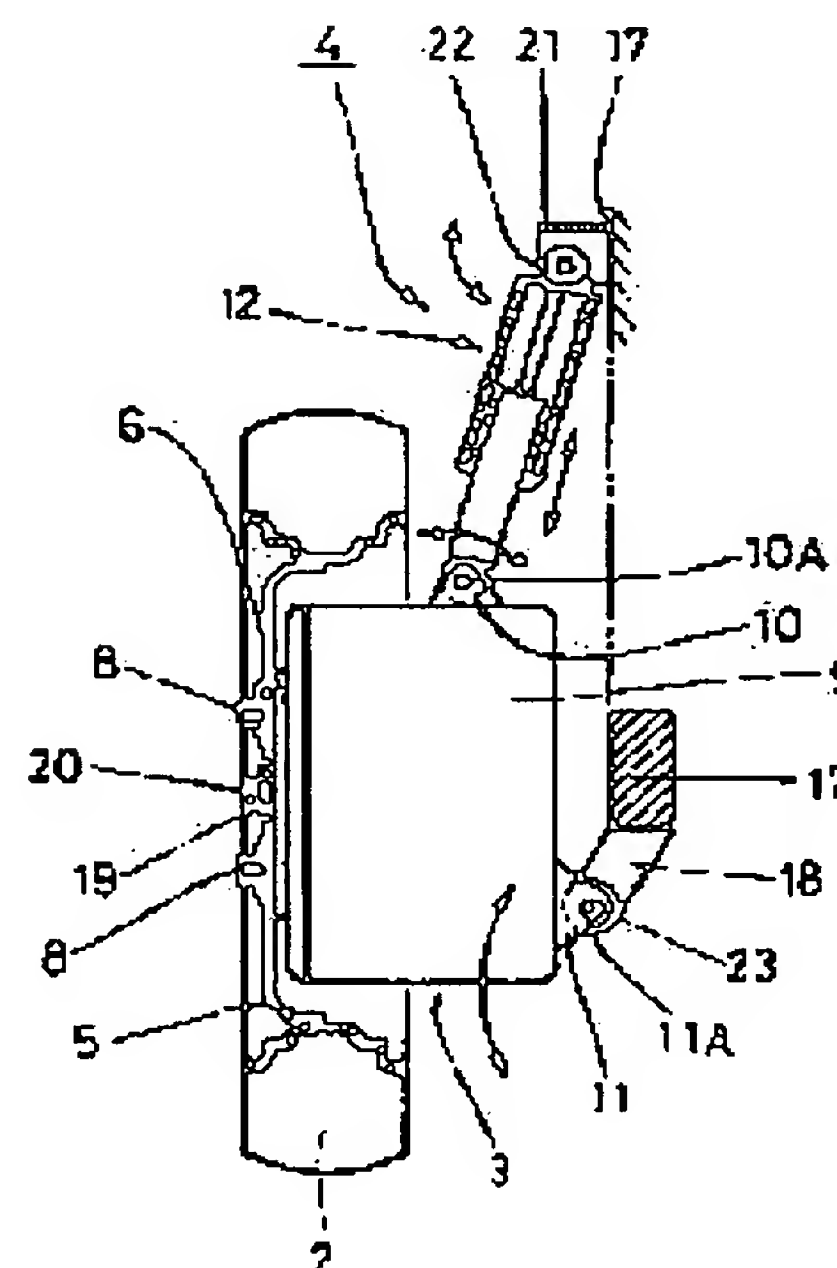
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**(54) SUSPENSION DEVICE FOR ELECTRIC VEHICLE**

(57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a suspension device for an electric vehicle whose lateral width can be decreased.

**SOLUTION:** In a wheel 5 of dirigible road wheel 2, a driving motor 3 is provided. In an upper surface side of a body of equipment part 9 of this driving motor 3, a cushion 12 connecting a car body frame 17 and the driving motor 3 is assembled able to turn. In a reverse surface side of the body of equipment part 9, relating to a bracket 18 extended from the car body frame 17, the driving motor 3 is directly connected.

**LEGAL STATUS**

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**CLAIMS**

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[Claim(s)]

[Claim 1] It is the suspension system for electric vehicles characterized by being directly linked rotatable between a car-body frame and said motor for a drive in the electric vehicle of an in wheel method made to rotate said driving wheel by the motor for a drive with which the wheel of a driving wheel was equipped.

[Claim 2] It is the suspension system for electric vehicles according to claim 1 which the cushion for a buffer is arranged between said car-body frame and said motor for a drive, and is characterized by connecting the edge by the side of the motor for a drive of the cushion of a parenthesis to the top face of the motor for a drive.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the suspension system in the electric vehicle of an in wheel method.

[0002]

[Description of the Prior Art] What was shown in drawing 5 and drawing 6 is the suspension system 100 for electric vehicles indicated by JP,3-31029,A. Such a suspension system 100 is indispensable in order to mainly absorb the vibration under transit of an electric vehicle (not shown).

[0003] In this suspension system 100, it is equipped with the motor 103 for a drive inside the wheel 102 of a tire 101, and the vertical arm 105,106 is connected to the vertical location of that motor 103 rotatable through upright 104. The other end side of the bottom arm 105,106 of besides is connected rotatable to the frame (not shown) of an electric vehicle. Moreover, the cushion 107 is connected in the middle of the bottom arm 106.

[0004]

[Problem(s) to be Solved by the Invention] However, in order to connect a motor 103 and a frame through an arm 105,106, the space for attachment is needed in the conventional suspension system 100, to the cross direction of an electric vehicle by the die length of this arm 105,106.

[0005] By the way, the above suspension systems 100 are used for the electric vehicle which is having high-speed transit of about per hour 100km planned in order to run a highway. That is, in order to absorb the vibration at the time of such high-speed transit, it is because it is necessary to permit the variation rate to the vertical direction of considerable extent to a tire 101.

[0006] On the other hand, like [ in case the transit only in a town is planned as opposed to this ], if it is the electric vehicle with which so much high-speed transit is not planned, it is not necessary to permit vibration of a tire 101, so that the conventional suspension system 100 is used.

[0007] It may be better to give priority to a miniaturization over the variability to the vertical direction of a suspension system 100 rather for such a demand.

[0008] This invention was made in view of the above-mentioned situation, and the purpose is in the place which offers the suspension system for electric vehicles which can make breadth small.

[0009]

[Means for Solving the Problem] In the electric vehicle of an in wheel method made to rotate said driving wheel by the motor for a drive by which the wheel of a driving wheel was equipped with the suspension system for electric vehicles concerning invention of claim 1 for solving the above-mentioned technical problem, it is characterized by being directly linked rotatable between a car-body frame and said motor for a drive. In addition, in this invention, also when making a short bracket besides in the case of only connecting the motor for a drive, and a car-body frame rotatable literally protrude from one of members and connecting it with "direct connection" through this bracket, it is contained.

[0010] Invention of claim 2 is a thing according to claim 1, and the cushion for a buffer is arranged between said car-body frame and said motor for a drive, and it is characterized by connecting the edge by the side of the motor for a drive of the cushion of a parenthesis to the top face of the motor for a drive.

[0011]

[Function and Effect of the Invention] According to invention of claim 1, the motor for a drive and the car-body frame are linked directly rotatable. For this reason, only the part which made the arm abolish compared with the suspension system connected through the arm like before can shorten breadth of a suspension system, and can make breadth of an electric vehicle small.

[0012] According to invention of claim 2, the cushion which it has between a car-body frame and the motor for a drive is connected to the top face of the motor for a drive. For this reason, when preparing for the rear-face side, only that part can narrow breadth of a suspension system.

[0013]

[Embodiment of the Invention] The [1st operation gestalt], next the 1st operation gestalt of this invention are explained referring to drawing 1 - drawing 3. The structure near the lower part of an electric vehicle 1 is typically shown in drawing 1. It is called an in wheel method, the hind driving wheel 2 of a Uichi Hidari pair is equipped with the motor 3 for a drive, respectively, and the drive method of the electric vehicle 1 in this operation gestalt rotates a driving wheel 2 directly by rotation of the motor 3 for a drive.

[0014] Drawing 2 shows the structure of the suspension system 4 of this electric vehicle 1. The driving wheel 2 is equipped with the foil 5, and it has the motor 3 for a drive inside this foil 5. The before [ the motor 3 for a drive ] side (side combined with the foil 5) is equipped with the turntable 6, and this turntable 6 is bound tight by the revolving shaft 20 of the motor 3 for a drive with the nut 19. Moreover, four bolts 7 protrude on the front face of a turntable 6 at the equal include angle on the same periphery, and attachment by the motor 3 for a drive and the driving wheel 2 is made by inserting these bolts 7 in the mounting hole established in the foil 5, and being bound tight with a nut 8.

[0015] Moreover, let the backside [ the motor 3 for a drive ] be the cylinder-like case section 9. The connection sections 10 and 11 protrude on the lower location of the top face of the case section 9, and a rear face. Among these, a cushion 12 is connected with the top-face side connection section 10 with which the top face of the case section 9 is equipped. As the thing of a two-sheet lot counters, the top-face side connection section 10 is formed so that it may meet in the direction of the revolving shaft 20 of the motor 3 for a drive, and it has pore 10A in the center, respectively.

[0016] A cushion 12 is for absorbing vibration which starts a driving wheel 2 while an electric vehicle 1 runs, and keeping good the degree of comfort of an electric vehicle 1, and is made deformable in the flexible direction. The T character-like 1st connection shaft 16 is formed in the edge at which a cushion 12 is attached in the motor 3 for a drive, and it is equipped with this 1st connection shaft 16 between the top-face side connection sections 10 of a pair using pore 10A. That is, in this connection part, the cushion 12 is made rotatable in the vertical direction by setting the 1st connection shaft 16 as a rotation core. Moreover, the upper limit section of a cushion 12 is attached to the car-body frame 17 of an electric vehicle 1 in the inside location of a car body rather than the top-face side connection section 10. The cross-section KO character-like bracket 21 for cushions is attached in this attachment part from the car-body frame 17, and the right-and-left both-sides wall surface which constitutes this bracket 21 for cushions is equipped with assembly hole 21A, respectively. the 2nd connection shaft 22 prepares for the top-face side of a cushion 12 -- having -  
- \*\*\*\* -- this 2nd connection shaft 22 -- both assembly hole 21A -- \*\*\*\* with a group -- it is connected in the above-mentioned 1st connection shaft 16 and this above-mentioned direction by things rotatable. In this way, the cushion 12 is attached in the car-body frame 17 and the motor 3 for a drive in the rotatable condition in the vertical edge.

[0017] Next, the structure of the circumference of the rear-face side connection section 11 prepared in the rear face of the case section 9 is explained. This rear-face side connection section 11 is formed as a two-sheet lot like the above-mentioned top-face side connection section 10, and it has pore 11A in that center. Moreover, the bracket 18 has extended from the car-body frame 17 side. From the car-body frame 17, a little, as a bracket 18 goes to an outside lower part, it protrudes on it, and the rear-face side connection shaft 23 is attached in a part for the point toward the cross direction of an electric vehicle 1. Thus, between the car-body frames 17 and brackets 18 which were linked directly, rotation of the vertical direction is permitted on the motor 3 for a drive.

[0018] Next, the operation effectiveness of this operation gestalt constituted as mentioned above is explained. During transit, a driving wheel 2 is shocked by the electric vehicle 1 according to a run state, the irregularity of a road surface, etc. It is made such and the added impact is absorbed by the flexible deformation of rotation and a cushion 12 in a suspension system 10 and 4 11, i.e., both the connection sections. At this time, the motor 3 for a drive and the car-body frame 17 are directly linked in case section 9 rear face with this operation gestalt by the rotatable one rear-face side connection section 11 other than a cushion 12. For this reason, only the part which made the arm 106 abolish compared with the suspension system equipped with the two rotatable connection sections through the arm 106 like before can shorten breadth of a suspension system, and can make breadth of an electric vehicle 1 small.

[0019] Moreover, the top-face side of the motor 3 for a drive is equipped with the end side of a cushion 12. For this reason, when the rear-face side of the motor for a drive is equipped with the cushion 12, only the



part which does not need to prepare a joining segment can narrow breadth of a suspension system.

[0020] The [2nd operation gestalt], next the 2nd operation gestalt of this invention are explained referring to drawing 4 . In addition, in this operation gestalt and the 1st operation gestalt, the same sign is given to the same configuration and explanation is omitted. With this operation gestalt, the revolving shaft 30 which protrudes from the front-face side of the motor 3 for a drive is equipped with the drum brake 31, and the foil 5 of a driving wheel 2 is connected through this brake 31.

[0021] Thus, also in this constituted operation gestalt, the same operation effectiveness as the 1st operation gestalt can be done so.

[0022] This invention is not limited to said operation gestalt, and a thing which is indicated below is also contained in the technical range of this invention.

(1) An electric vehicle may not be a wagon. For example, a tricycle, the Olympic Games vehicle, etc. may be used.

(2) Not a rear drive but a front wheel is sufficient as a driving wheel.

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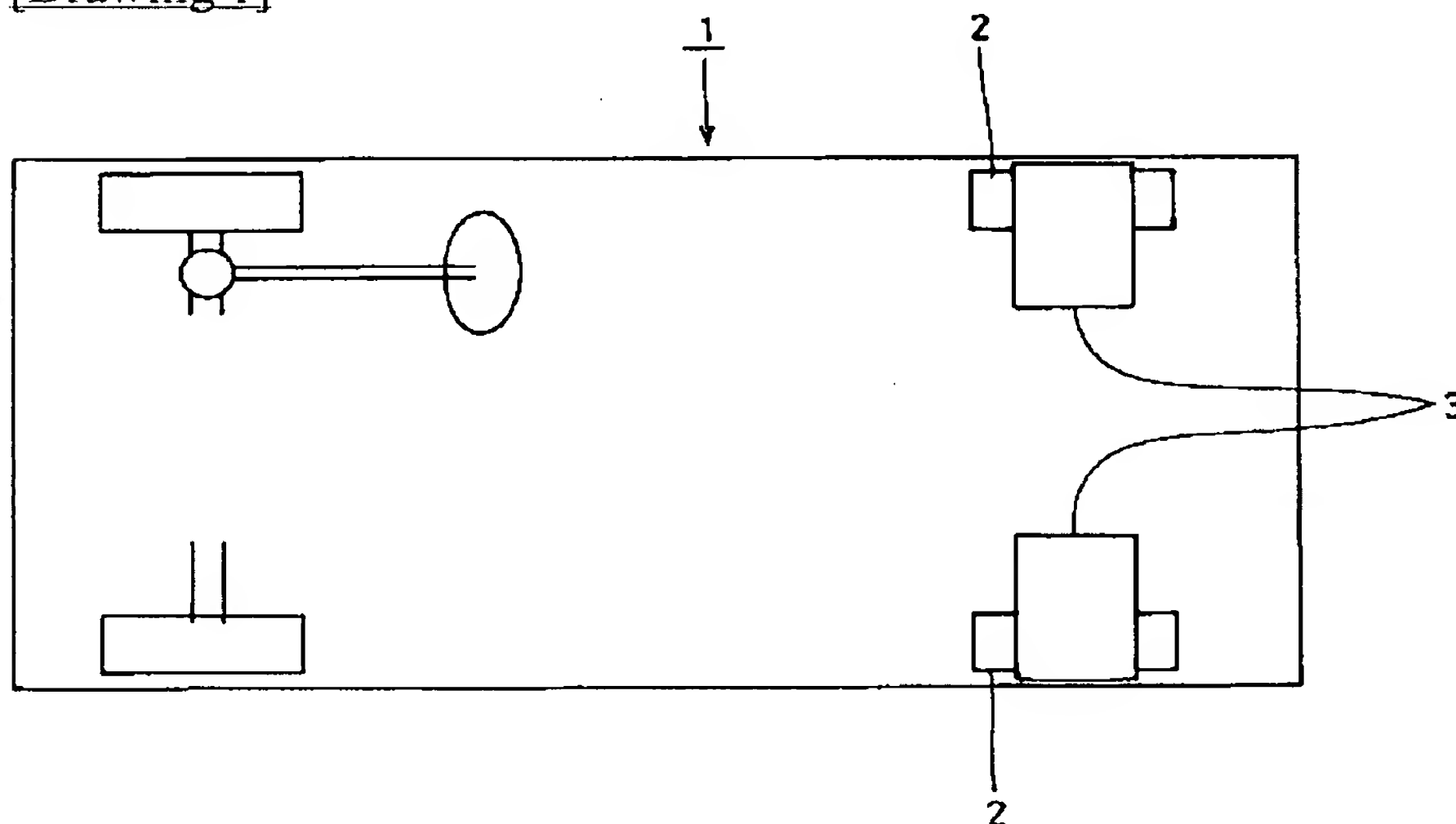
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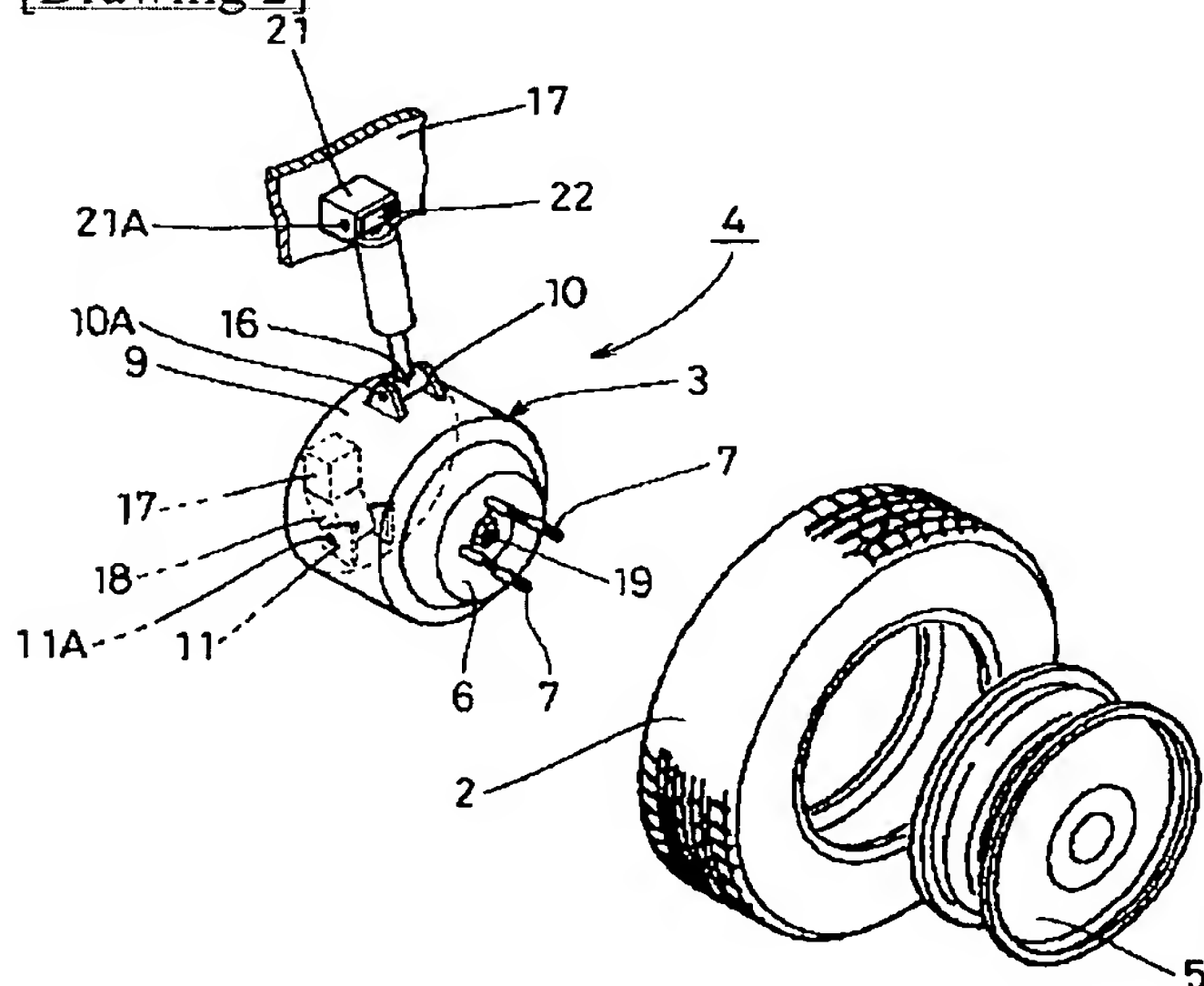
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## DRAWINGS

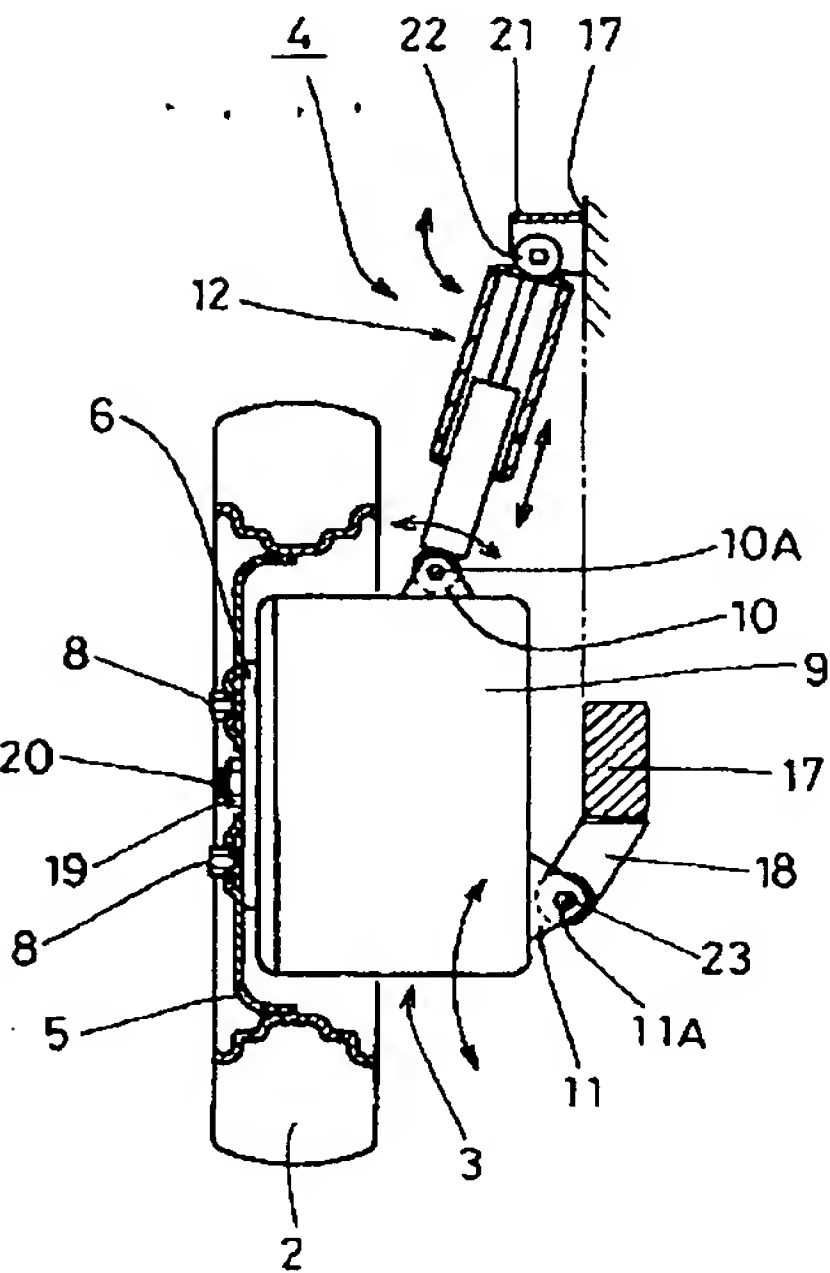
[Drawing 1]



[Drawing 2]

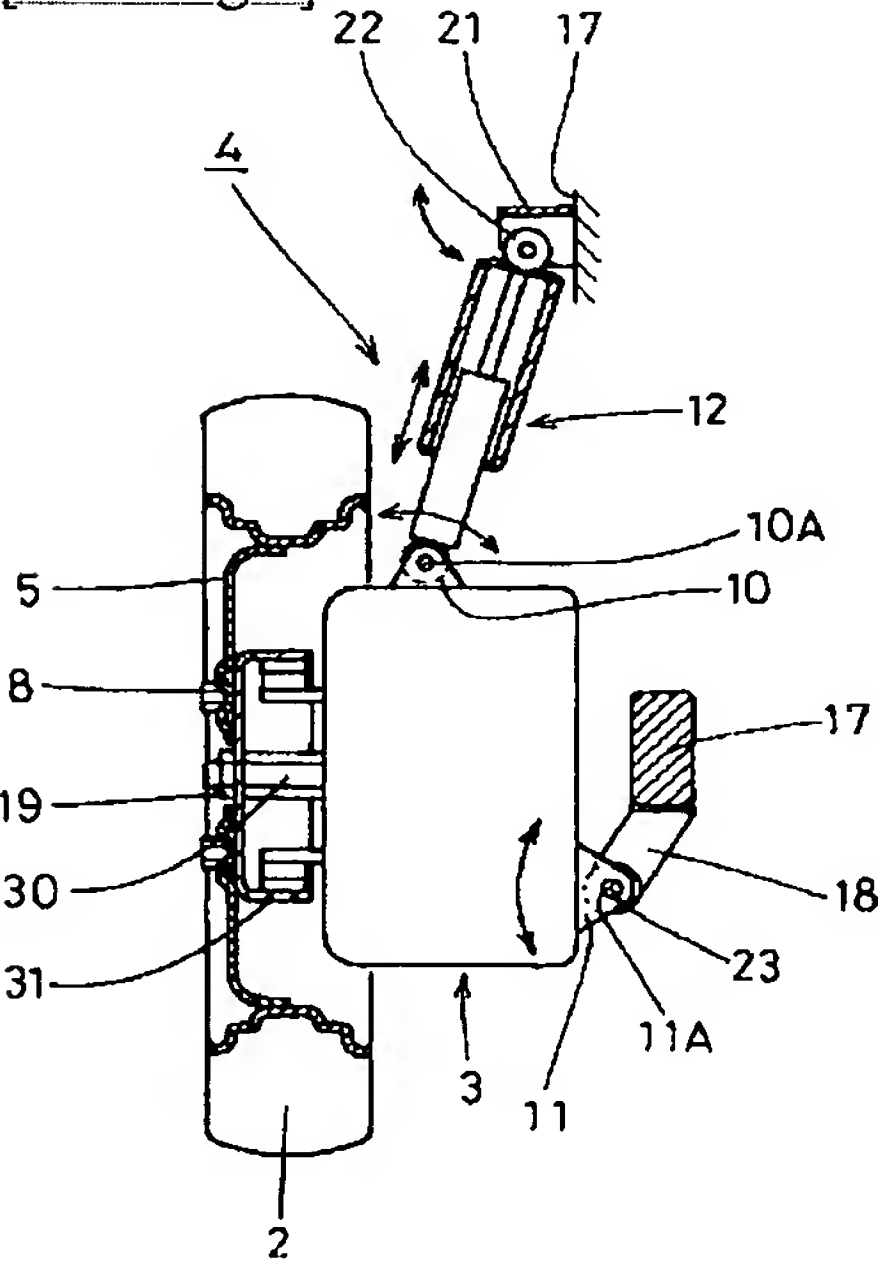


[Drawing 3]

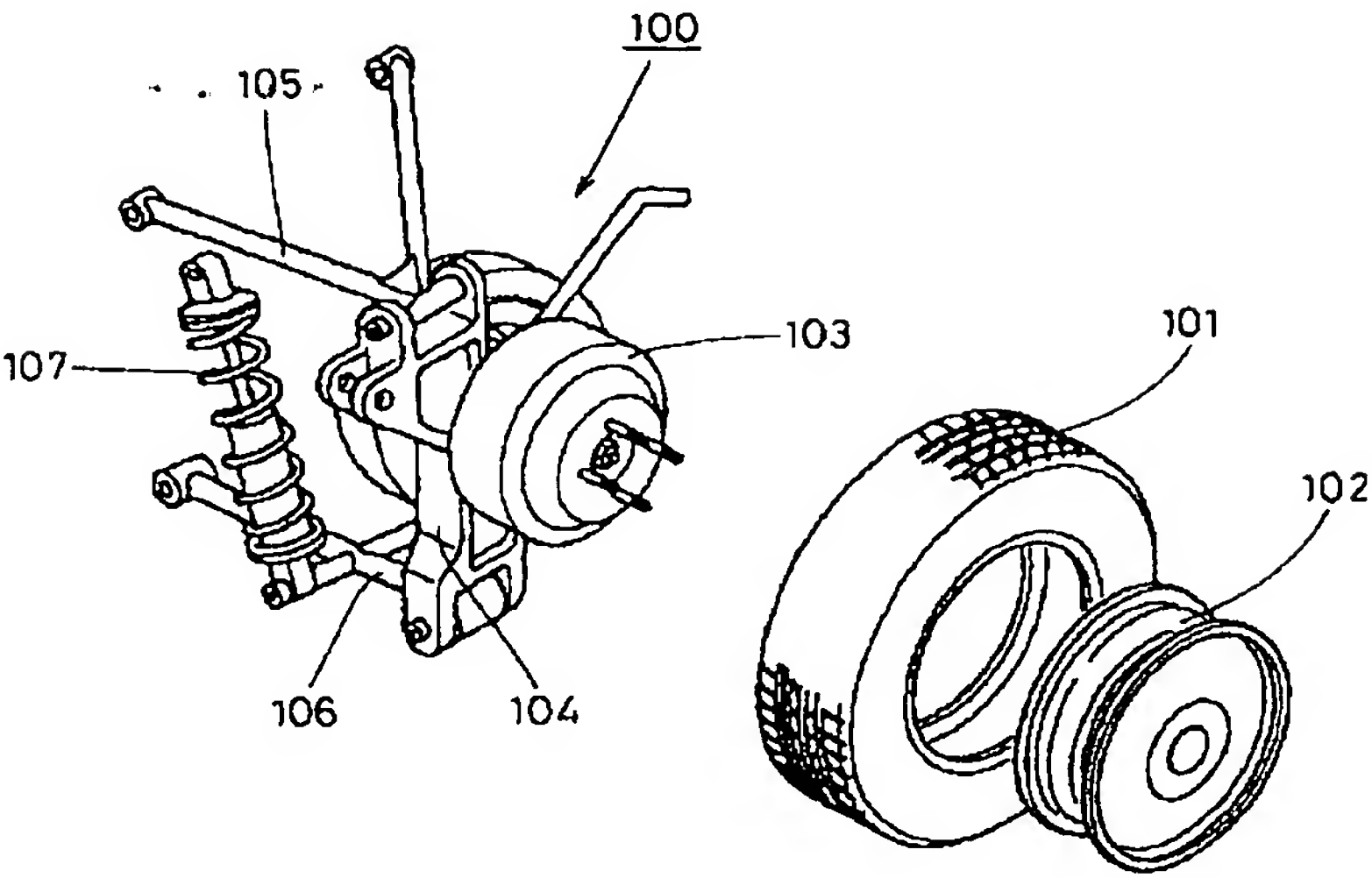


- 2…駆動輪
- 3…駆動用モータ
- 4…懸架装置
- 5…ホイール
- 12…クッション
- 17…車体フレーム

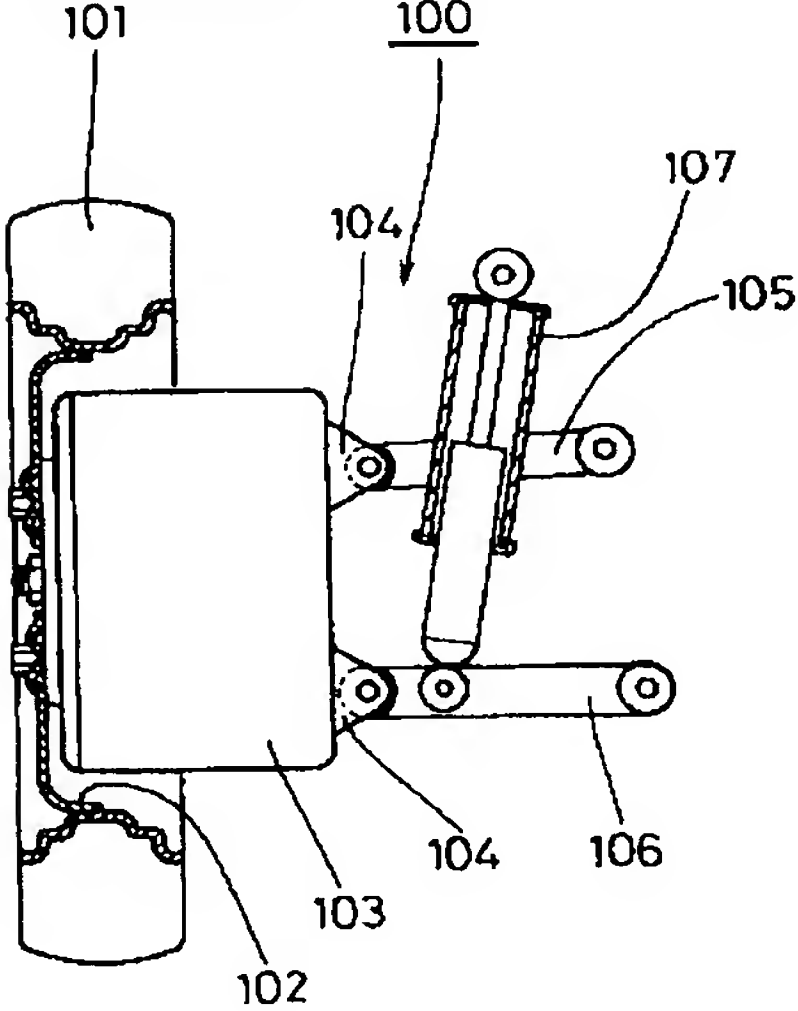
[Drawing 4]



[Drawing 5]



[Drawing 6]



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